

# PROGRESS IN GEOLOGIC MAPPING OF THE NORTHERN PLAINS OF MARS

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**Introduction:** We have initiated a new geologic map of the northern plains of Mars at 1:15,000,000 scale which will incorporate the new data from Mars Orbiter Laser Altimeter (MOLA), the Mars Orbiter Camera (MOC), and the Thermal Emission Spectrometer (TES) on board the Mars Global Surveyor (MGS) spacecraft. This project is funded by the Mars Data Analysis Program and will result in a published map in the U.S. Geological Survey's Geologic Investigations Series.

**Methods:** A preliminary version of the geologic map based on Viking images has been compiled on the Mars Digital Image Mosaic (MDIM), version 1.0. Because this mosaic is being revised to display improved radiometric and geometric controls, we need to remap preliminary contacts. Map data are being assembled in a Geographic Information Systems database to produce a digital map that can be used for studies of the map units and features. Also, solid versus dashed contacts are distinguished.

**Results and future work:** Thus far, we have mapped 42 units. These units include interior and local plains materials, volcanic

flows, polar materials, highland units, crater materials, and other local units. Many of the units are provisional, because (1) we have not been able to map the extents of some units completely, (2) we may later choose to combine some units, and (3) we have not investigated their topographic, morphologic, and mineralogic characteristics fully with MGS data. Moreover, stratigraphic relations and crater-density data need to be compiled to establish relative ages of units as well as their individual outcrops. We also would like to unravel the geologic history of the region, including erosional, sedimentary, volcanic, tectonic, and impact events and processes and their interrelations. For example, we are exploring the erosion of the Chryse outflow channels, their relation to deposition in the northern plains, and tectonic sagging related to thick sedimentation within the northern plains; rapid sedimentation, sedimentary volcanism, and tectonism of the deposits in Isidis Planitia; and volcano-ice interactions that produced troughs in northwestern Elysium Mons and extensive channels and lahars in Utopia Planitia.